

Atty Dkt. No.: 10010464-1
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REMARKS

In view of the following remarks, the Examiner is requested to allow Claims 1-33 and 49 to 53, the only claims pending and under examination in this application.

Formal Matters

Claim 1 has been amended for clarity as suggested by the Examiner.

Claim 7 has been amended to correct a typographical error (added period at the end of the claim).

Claims 1, 6 and 25 have been amended to specify that the non-error dispensers dispense drops only where the identified error dispensers did not dispense drops. Support for this amendment can be found throughout the specification (see, e.g., page 3, lines 15 to 20; page 13, line 16 to page 14, line 27; and Figures 4, 5 and 8).

Claims 49 to 53 have been added. Support for new Claims 49, 50, 51 and 53 can be found throughout the specification (see, e.g., page 7, line 13 to page 8 line 10; page 11, lines 17 to 23; and page 25, lines 16 to 18).

Support for new Claim 52 can be found throughout the application as filed (see, e.g., Claim 1 as originally filed and the specification at: page 3, line 16 to page 4, line 14; page 3, lines 15 to 20; page 13, line 16 to page 14, line 27; and Figures 4, 5 and 8).

As no new matter is added by way of these amendments, entry of the amendments by the Examiner is respectfully requested.

Rejection Under 35 U.S.C. §112

The Examiner has rejected Claims 1-33 under 35 U.S.C. §112, second paragraph, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

In making this rejection, the Examiner asserts that the recitation of the term "each set" in Claim 1 (and dependent claims) is uncertain because it is unclear whether this limitation refers to the "at least one set of redundant dispensers" in lines 7-8.

In response, Applicants have amended Claim 1 to make clear that the recitation of "each set" is referring to "at least one set of redundant dispensers".

The Examiner further asserts that the claims are incomplete for omitting essential structural cooperative relationships of elements, resulting in a gap between the necessary structural connections.

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First, the Applicants submit that the structural cooperative relationships of elements are complete in the claims of the present invention. Each of the terms used in the claims (e.g., groups, sets, frames, series, paths and patterns) has abundant detailed description in the specification, including schematic Figures which show examples of the relationship between these elements (e.g., Figure 4). Therefore, the Applicants submit that the cooperative relationship of these elements when used in the claims is clear when read in light of the specification. The Applicants refer the Examiner to previous responses and the Appeal Brief of October 28, 2005 in which the claim terms and their structural relationships are described in substantial detail.

Second, each of the independent claims (1, 6, 25 and 52) specifies that the non-error second dispenser dispenses drops only where the identified error first dispenser did not dispense drops in the pattern for the selected path. Applicants submit that this element provides additional characterization of the structural cooperative relationships of the elements of the claimed invention.

Therefore, because the claims of the present application have not omitted essential structural cooperative relationships, the Applicants respectfully request withdrawal of this rejection.

Rejection Under 35 U.S.C. §102

The Examiner has rejected Claims 1-33 under 35 USC § 102(b) as being anticipated by Kumar et al. (US 6,283,572).

As stated in *Verdegual Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."

The subject application claims methods for fabricating an array. To illustrate the elements of the invention, independent Claim 1 of the application is discussed in detail below. This analysis also holds for independent claims 6 and 25 as well as new Claim 52.

To clarify the claimed array fabrication method, a representative embodiment is described below. The head system claimed contains multiple dispensers configured (again, in an exemplary fashion) as shown in Figure 4A of the subject specification. For clarity, Figure 4A has been reproduced and below with additional annotation (specifically, a *Group* [in the rectangle] and a *Set* [in the oval] of dispensers are indicated).

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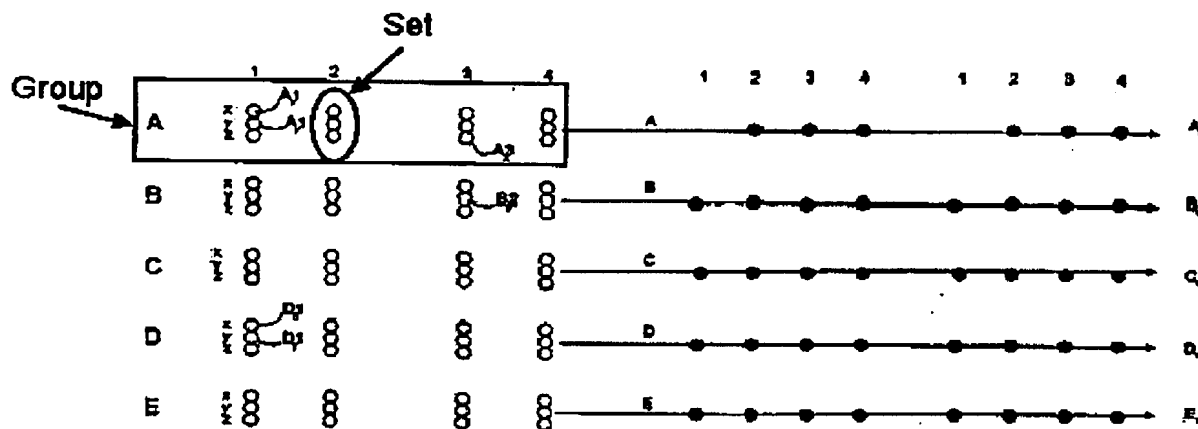


FIG. 4A

As shown above and described in the specification, the head systems claimed in the subject application have multiple *Groups* of dispensers (i.e., at least two). Each *Group* of dispensers of the claimed head system (e.g., Group A [in the rectangle]) contains at least one *Set* of dispensers, with each *Set* containing multiple dispensers (e.g., dispensers Ax2, Ay2 and Az2 make up *Set* A2 [in the oval]).

As recited in the claimed methods, the dispensers are loaded such that each *Set* of dispensers contains the same fluid (step *a*), the dispensers are tested to identify dispenser errors (step *b*), and the head system is moved such that a first dispenser of each set (e.g., dispensers in row *y* of the *Sets*) travels along the selected path (the black lines on the right of Figure 4A indicate the selected path) while depositing drops from the non-error dispensers (step *c*). The deposition of drops is depicted in Figure 4A on the right, with black dots representing deposited drops from specific dispensers of the head system. As can be seen in this example, dispenser Ay1 did not dispense a drop at its intended location (i.e., position A1 on the right) because it is an error dispenser. In step *d* of the claimed methods, a second non-error dispenser from the *Sets* in each *Group* is moved along the same selected path (e.g., the dispensers in row *x* of the *Sets* would follow the selected path) and dispenses drops where one was not deposited by an error dispenser of the same *Set* (e.g., dispenser Ax1 deposits a drop where error dispenser Ay1 failed to do so). In step *e* of the claimed methods, steps *a* to *d* are repeated as necessary to fabricate the array.

As is clear from the above description, this method of fabricating an array utilizes redundant dispensers (i.e., *Sets* of dispensers) in such a way that a drop that was not deposited by a first defective (or error) dispenser of a *Set* is deposited by a second (or third) non defective (or non-error)

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dispenser of the same *Set*. The claimed configuration of dispensers makes the claimed method possible.

As noted in the previous section, the independent claims of the present application specify that the non-error second dispenser of a set dispenses drops only where the identified error first dispenser of the same set did not dispense a drop in the pattern for the selected path. In other words, the redundant non-error dispensers of a set do not deposit drops in locations other than where an error dispenser in the same set won't deposit a drop.

The drop deposition method of Kumar et al. is designed specifically for correcting errors in multi-pass ink deposition. In multi-pass ink deposition, drops of the same type of ink that are deposited in the same row are deposited by different dispensers in different passes. In the example shown in Kumar et al. (see Tables I and II), every fourth drop is deposited by a different dispenser in a different pass (see Table I). If one dispenser is not firing properly, then a dispenser used in a different pass to drop at a separate location is employed to fill in the missing drop during its normally scheduled pass (Table II).

Therefore, in contrast to the claimed methods, the "non-error" dispensers employed in Kumar et al. are not redundant dispensers as is claimed. Specifically, the "non-error" dispensers of Kumar et al. deposit drops in locations other than where an error dispenser in the same set did not deposit a drop.

Because Kumar et al. fails to teach each and every element of the claims, the Applicants submit that it fails to anticipate them and thus respectfully request withdrawal of this rejection.

Rejection Under 35 U.S.C. §103

The Examiner has rejected Claims 1-33 under 35 USC § 103(a) as being unpatentable over Tisone et al. (US 6,063,339) in view of Hackleman (US 5,640,183), Anderson (US 6,076,910) and Schultz (US 5,985,356).

The law is clear that to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 21 USPQ2d 1941 (Fed. Cir. 1992). Second, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 231 USPQ 375 (Fed. Cir. 1986). Finally, the prior art reference, or references when combined, must teach or suggest all the claim limitations. *In re Royka*, 180 USPQ 580 (CCPA 1974). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*,

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20 USPQ2d 1438 (Fed. Cir. 1991).

In making this rejection, the Examiner asserts that Tisone et al. disclose each of the elements of the claimed invention except error detection and the use of redundant dispensers in fabricating an array.

To remedy these deficiencies, the Examiner cites Hackleman for its asserted teaching of dispensing drops to identify error dispensers and employing redundant nozzles to compensate for any inoperable nozzles identified.

However, the Applicants submit that Hackleman fails to teach identification of error dispensers as asserted by the Examiner. Rather, the method of Hackleman is drawn to employing a randomizing method of multiple drop-deposition at a location that obviates the need for identifying error dispensers and using redundant dispensers in their place. See, e.g., col. 4, lines 25 to 33, which states:

25 designated pixel. The present invention, by utilizing not only
a double-dot always strategy but also randomizing the
selected nozzles in each pass, virtually eliminates the like-
lihood of a target pixel not receiving at least one droplet of
ink as the potential selection of two non-functional nozzles
30 is much smaller. In fact, the only time when a periodic
failure would be detected would be when the number of
failures exceeded the random sampling criteria's redun-
dancy factor.

Therefore, contrary to the Examiner's contention, Hackleman does not teach error identification followed by the use of second non-error dispensers as is claimed. Moreover, the Applicants note that the "redundant" dispensers in Hackleman are employed to dispense drops in error locations as well as non-error locations, and not only in locations where an error dispenser in the same set failed to deposit a drop. Indeed, the methods of Hackleman do not positively identify a location where an error dispenser failed to dispense a drop, so it is impossible using Hackleman's methods to only deposit drops from a second dispenser at a location where a first error-dispenser did not do so.

Hackleman thus fails to fill any deficiency in Tisone et al. in making the claimed invention obvious. Indeed, in teaching that error detection is not required, Hackleman teaches away from the claimed invention. In other words, there is no teaching or suggestion in Hackleman to identify an error dispenser and alternatively use a second, non error dispenser of the same set to deposit a drop only at the location where the error dispenser did not deposit a drop.

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The Examiner further asserts that Anderson remedies the deficiencies of Tisone et al. also by assertedly teaching dispenser error identification and redundant dispenser use as is claimed.

However, the Applicants submit that Anderson et al. fails to teach the claimed error identification and redundant dispenser use. Specifically, the Applicants direct the Examiner to col. 2, lines 32 to 38 of Anderson which states the following (overlapping section was cited by the Examiner in making this rejection):

It is further contemplated that the printer may be provided with a nozzle testing station. There, each nozzle is tested to determine if it is operable. If not, its associated nozzle found on the same horizontal line does double duty during normal speed operation. Hence, if a nozzle fails and b associated nozzle is operable, all of the data to be printed by the nozzle pair will be printed during normal mode operation.

As is clear from this section, the "redundant" dispensers employed in Anderson do "double duty" during printing if an error detector is identified in a dispenser (similar to Kumar et al., described above). By "double duty" in Anderson is meant that the redundant dispensers deposit drops at locations other than where error dispensers failed to do so. As discussed in detail above, the second non-error dispensers of the claimed invention dispense drops only at a location where an error dispenser of the same set did not deposit a drop; it is not used at other locations in the pattern deposited on the substrate.

Therefore, contrary to the Examiner's contention, the Applicants submit that Anderson does not teach error identification followed by the use of second non error dispensers as is claimed.

The Examiner cites Schultz for its asserted teaching of ink jet technology for printing arrays.

However, the asserted teachings of Schultz fail to remedy the deficiencies in the combined teachings of Tisone et al., Harkman and Anderson. Specifically, Schultz fails to teach employing redundant dispensers of a set to deposit drops only at locations where an error dispenser did not do so.

Finally, the Applicants submit that there is no suggestion or motivation in the cited references to employ redundant dispensers to dispense drops only at locations where an error dispenser of the same set did not do so. Specifically, because both Hackleman and Anderson employ "redundant" dispensers to deposit drops at locations other than where error dispensers did not deposit a drop, modifying them to arrive at the claimed invention would change their principle of operation. The law is clear that a *prima facie* case of obviousness cannot be established by modifying the teachings of prior art references in a way that alters their principle of operation (see, e.g., *In re Ratti*, 270 F.2d

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810, 123 USPQ 349 (CCPA 1959)).

Therefore, because the combined teachings of Tisone et al., Hackleman, Anderson and Schultz fail to teach or suggest each and every element of the claimed invention, the Applicants submit that a *prima facie* case of obviousness has not been established. As such, the Applicants respectfully request that this rejection be withdrawn.


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CONCLUSION

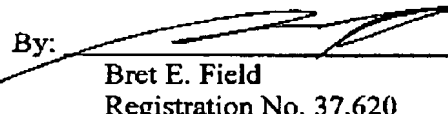
In view of the amendments and remarks above, the Applicants respectfully submit that all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this application, please telephone Bret Field at (650) 833-7770. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to Deposit Account No. 50-1078, order number 10010464-1.

Respectfully submitted,

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